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BELL, BOYD & LLOYD, LLP			EXAMINER	
P.O. BOX 1135			YEH, EUENG NAN	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

**Application No.**

10/502,423

**Applicant(s)**

BASE ET AL.

**Examiner**

Eueng-nan Yeh

**Art Unit**

2624

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 14-23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 July 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. ____                                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>Jul 23, 2004</u>  | 6) <input type="checkbox"/> Other: ____                           |

## DETAILED ACTION

### *Priority*

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### *Drawings*

2. The drawings are objected to because of following minor informalities:

Figure 2 is objected to as failing to comply with 37 CFR 1.84(p)(5) because it does include the following reference characters, 9A – 12A, not mentioned in the description. Furthermore, as stated at page 7 line 30: "in Fig. 2, it is clear that the image disturbances in images No. 11 and No. 12 have disappeared". It would be helpful to identify these disturbances on the figure to support above statement. Same situation appears in figure 1: "a large part of the incorrect area again appears in image No. 11 of Fig. 1" at page 7, line 14.

According to the claims and specification, this application is: i) accessible reference images for the motion vectors are limited (at specification page 4, lines 10-11) and ii) this limitation is based on the first intra-coding mode application (at specification page 4, lines 11-12). However, the presented figures 1 and 2 merely show the decoded results and not the processes. It is plausible to have flow blocks to high light the concept of this invention. Furthermore, to have some diagrams to illustrate the processes of restriction of reference frames and selection and optimization of macroblock can also be very helpful to understand this application.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

### ***Specification***

3. The disclosure is objected to because of the following informalities and appropriate corrections are required:
  - a) Page 3, line 18, "vol. 1, 16.09.1996, pp. 763-766 (Lio et al)". The correct statement is "vol. 43, 16.09.1996, pp. 763-766 (Liao et al).
  - b) Page 3, line 22, "vol. 5, 23.3.1992". The correct statement is "vol. 53, 23.3.1992".

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- c) Page 8, lines 5-21, the arguments (m, r, v) used by  $D_{DFD}$  and  $R_{motion}$  are mixed in scalar (i.e. lower case) and vector (i.e. bold face). Clarification is needed.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 14-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of J. Kim et al. (US 2003/0031128 A1; hereinafter referred to as Kim03) and H. Kim et al. (US 2002/0126757 A1; hereinafter referred to as Kim02).

Regarding claim 14, Kim03 discloses a coding system comprising:  
coding the macro blocks to determine accessible reference images ("An enhanced Adaptive Intra Refresh (AIR) process provides efficient error resiliency by selectively and adaptively encoding macroblocks in a predicted frame" in paragraph 16, line 1. See also "error resiliency technique adopted by MPEG-4 is data partitioning, used to separate motion information from texture information using a second resynchronization marker inserted between motion and texture information. Thus, if there is an error and the texture information is undecodable or lost, the decoder can utilize the motion information to conceal the error by

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using the motion information to compensate the previous decoded frame or VOP” in paragraph 12, line 6);

coding a section of the macro blocks of the images in a section of the image in a first intra-coding mode depending on predetermined criteria (“Many standard MPEG-4 encoders can only handle one scene, that is, one I-frame followed by P-frames or B-frames, or they introduce regular I-frames every k frames, as is commonly done in MPEG-2 encoding ...” in paragraph 47, line 1. The predetermined criteria can be the error resiliency error robustness condition: “An enhanced Adaptive Intra Refresh (AIR) process provides efficient error resiliency by selectively and adaptively encoding macroblocks in a predicted frame” in paragraph 16, line 1, and “MPEG-4 provides for object scalability, improved error robustness and enhanced compression” in paragraph 9, line 6);

coding another section of the macro blocks of the image in a second intra-coding mode, wherein the number of accessible reference images selects a specified number of macro blocks (“... In one embodiment, an adaptive motion area process is performed to determine which macroblocks are to be intracoded.

Adaptive motion change detection can efficiently reduce the large propagation error, including errors occurring in the motion area ...” in paragraph 16, line 3);

limiting the selection from the number of accessible reference images in such a way that referencing takes place from image areas that were not subjected to the first intra-coding mode at a later stage (“... [a]n intercode distortion value and an intracode distortion value are calculated, as are an intercode bit quantity and an intracode quantity. Based on a comparison of the calculated intercode distortion

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value and the intracode distortion value, and on a comparison of the intercode bit quantity and the intracode bit quantity for each macroblock, a decision is made as to which predicted frame macroblocks are to be intracoded" in paragraph 16, line 8).

Kim03 does not explicitly disclose a coding system to perform the intra/inter block selection.

Kim02, in the same field of endeavor of video encoding ("intra updating technique based on error probabilities estimated from a size of bit stream for each block" in paragraph 1, line 3), discussed in figure 2, numerals 209 and 210 for inter/intra coding process: "[w]hen carrying out an encoding as a measure for the case where errors occur during the transmission, and where thus the normal decoding becomes impossible, the relevant blocks are not subjected to the inter coded frame encoding method, but to the intra coded frame encoding method" in Kim02 paragraph 20, line 5.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to provide the coding system Kim03 made with intra/inter block coding selection as taught by Kim02, "thus, the degradation of the picture quality due to the error propagation can be overcome ..." in Kim02 paragraph 39, line 10.

Regarding claim 15, the predetermined criteria for carrying out the coding in a first intra-coding mode are error robustness criteria with respect to an incorrect transmission of coded images (discussed in claim 14, "MPEG-4

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provides for object scalability, improved error robustness and enhanced compression" in Kim03 paragraph 9, line 6).

Regarding claims 16 and 17 (the first intra-coding mode under error robustness condition was carried out by MGPE-4: "MPEG-4 has enhanced error resiliency as compared to previous versions of MPEG so that video data can be more successfully transmitted over such error prone networks ..." in Kim03 paragraph 11, line 1. This can be carried out at regular time intervals: "standard MPEG-4 encoders can only handle one scene, that is, one I-frame followed by P-frames or B-frames, or they introduce regular I-frames every k frames ..." in Kim03 paragraph 47, line 1. Or, at random time intervals: "To adequately improve the coding efficiency, the number of I-frames should be reduced or minimized. In the absence of error conditions, I-frames are preferably used in scene-changes only ..." in Kim03 paragraph 47, line 7).

6. Claims 18-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Kim03 and Kim02 as described above, and further in view of Yokoyama et al. (US 6,078,618).

Regarding claim 18, the combination of Kim03 and Kim02 teaches a coding system comprising:  
determining a rate distortion movement compensation value for each of the vectors ("... [b]ased on a comparison of the calculated intercode distortion value and the intracode distortion value, and on a comparison of the intercode bit



quantity and the intracode bit quantity for each macroblock, a decision is made as to which predicted frame macroblocks are to be intracoded” in Kim03 paragraph 16, line 10. Without departing from the scope and spirit of Kim03’s methodology, the amount of distortion value and bit quantity is the rate distortion movement compensation value); selecting the detected movement vectors in accordance with a determined rate distortion movement compensation value (as discussed above, the rate distortion movement compensation value will be used to determinè macroblocks which defines the movement vectors).

The Kim03 and Kim02 combination does not explicitly disclose the moving vector optimization.

Yokoyama, in the same field of endeavor of video encoding (“relates to a motion vector estimation system which is used for encoding a moving picture” at column 1, line 4), illustrates the motion vector estimation system in figure 1, numeral 103: “the invention is to provide the motion vector estimation system and method capable of estimating the optimum motion vector even in the case where a limited search window is used” at column 3, line 5.

It would have been obvious at the time the invention was made to one of ordinary skill in the art to provide the coding system of Kim03 and Kim02 combination, to include moving vector optimization as taught by Yokoyama, “...to improve the picture quality measured by the S-N ratio ... to estimate the optimum motion vector, thereby obtaining an improved effect of the picture quality ...” at column 10, line 32.

Regarding claim 19, the step of limiting the selection from the number of accessible reference images further comprises the step of creating a limited number of inter-coding mode combinations and reference images, wherein combinations that were coded in a later image in a first intra-coding mode are removed (as depicted in Kim02 figure 2, numerals 206 and 213 to create a limited number of inter-coding and reference image).

Regarding claim 20, the step of limiting the selection from the number of accessible reference images further comprises the step of forming a best combination based on the rate distortion (discussed in claim 18 the moving vector is optimized, thus, the distortion rate optimally comprises the best combination. Furthermore, "A certain number of bits are needed for the Inter mode encoding and the Intra mode encoding ... can be used to select the best coding mode" in Kim03 paragraph 228, line 1. See also Kim02 figure 2, numeral 212 the threshold control for the frame and bit determination).

Regarding claim 21, the rate distortion is determined by processing an error rate to be expected when the coded images are transmitted ("If the encoder has sufficient resources and capability, a full Rate-Distortion optimization can be performed that involves determination of an optimal weighting factor  $\lambda$  to be used for evaluating a cost function for each macroblock, given by:

$$C = D + \lambda R$$

Equation 24"

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in Kim03 paragraph 229, line 1. Wherein D is the rate and R is the distortion).

Regarding claim 22, the distortion of the pixel values contains the total of the quadratic differences between the pixel values before coding and the correspondingly decoded pixel values ("in one embodiment the encoder system 100 includes corresponding decoder circuitry so that it can mimic the decoder process and reconstruct what the decoder will reconstruct both in the absence of errors, and in the presence of one or more errors, such as a single error affecting just the current macroblock ("MBC"). By way of example, the difference between the error-free reconstruction and the reconstruction assuming one error is termed "concealment error" or EC. EC is defined as follows:

$$EC = MBQ - MBC$$

Equation 16

Where MBQ is the error free reconstruction, and MBC is a single error reconstruction" in Kim03 paragraph 198, line 2. Furthermore, variance, i.e. quadratic difference, is being introduced in Kim03 paragraphs 208 and 209).

Regarding claim 23, the distortion is estimated to determine the rate distortion criteria (discussed in claim 21 Equation 21, the distortion D is estimated to determine the cost function C, i.e. the rate distortion).

### ***Conclusion***

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:


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- Zhang et al. (IEEE, ACSSC, Vol. 1, Oct 1999, 332-336): intra/inter mode switching to stop error propagation.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eueng-nan Yeh whose telephone number is 571-270-1586. The examiner can normally be reached on Monday-Friday 8AM-4:30PM EDT.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vikkram Bali can be reached on 571-272-7415. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
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